

masses which he has called "system clouds" form huge layers, generally discontinuous (at least at their borders), where the undulations may be distinctly observed.

The clouds show us the long waves which must necessarily be formed between two layers of air sliding one over the other and between which clouds are interposed.

However, Dobrowolski's work should be continued, and the only way to bring it to a satisfactory end and to resolve the fine problems of atmospheric dynamics which are still awaiting a definite solution is to have good observers distributed at a series of stations sufficiently close together so that the same system of clouds might be studied simultaneously through its whole extent. If we look forward into the question of the scientific exploration of the Antarctic regions the idea of an international cooperation, of the concentration of all efforts toward one and the same end, this idea must necessarily pursue us.

The Cape Horn region and the lands situated farther south seem to me very favorable for the establishment of a polygon of stations, the chosen places being Falkland Islands, Staten Island, one of the islands of Diego Ramirez, and the lighthouse of Los Evangelistas; then the South Georgia, Sandwich, Orkney, and South Shetland islands; lastly, a station on the coast of Graham Land, another at the wintering station of Nordenskjöld, for example, and two floating stations—one in the region of the drift of the *Belgica* and the other in the Weddell Sea. We would have in this way a polygon of posts of observation sufficiently large, and composed at the same time of points sufficiently near together.

The expenses of such an undertaking might be counted as follows:

A ship wintering in the ice in the region of the drift of the *Belgica*, \$100,000.

A second ship in Weddell Sea, \$100,000; a third, exploring the edge of the pack and studying the variations of the distributions of the ice and making oceanographic researches during the whole year, \$100,000.

The first and second may install each a station on the Antarctic lands, and the third, in two cruises, the four stations on Sandwich, Georgia, Falkland, and Shetland islands—let us count six stations at \$30,000 each.

And, lastly, as for the region of Cape Horn, there is already a good meteorological station on the Island Año Nuevo, near Staten Island, while that one of the lighthouse of Los Evangelistas would probably need a special staff and instruments, and so let us simply count Diego Ramirez, \$20,000, and a mountain station, for example, on the summit of the mountain called Bonnet de la République, near Llopoiaia, the installation and all the working expenses of which would not exceed \$30,000.

The entire expenses of such an undertaking, then, would not, as you see, exceed \$530,000.

If you will bear in mind that this expense would be divided between the different nations taking part in this expedition, and that, aside from the meteorological work, other researches, oceanographic, etc., would certainly be undertaken, you will see that the proposition which I submit could be easily realized, and that our knowledge of the physical conditions of the globe would be enriched by an enormous amount of new scientific data, for the acquisition of which it is worth while to sacrifice the money and necessary efforts.

DEFLECTION OF THUNDERSTORMS WITH THE TIDES.

CAPE MAY COURT HOUSE, N. J., November 9, 1904.

Prof. WILLIS L. MOORE,

Chief of U. S. Weather Bureau, Washington, D. C.

SIR: In the August issue of the MONTHLY WEATHER REVIEW, I note, with interest, an article from Mr. George L. Lovett, of Cape May, N. J., regarding the deflection of thunderstorms by the tides as they pass up and down the Delaware Bay.

I wish to concur with him as to the facts as stated, from several years' observation.

It is a common occurrence, during the summer months, to witness heavy cumulo-stratus clouds passing up the bay with the rising tide, and down the bay with the falling tide, but more frequently do they pass up. At Cape May Court House, N. J., which is twelve miles from Cape May and about three miles west of the ocean, it is seldom we have a thunderstorm simultaneously with a falling tide, but usually with the beginning or on top of the flood tide. If, as occasionally occurs, a storm comes on the ebb tide, it is generally heavy and accompanied with dangerous lightning and heavy winds. It is the invariable practise of our baymen, on observing a "squall rising" as they term it, during the ebb tide, to seek shelter before the flood tide makes, when they look for the storm to break forth.

Another phenomenon is, that thunderstorms more frequently either follow the Delaware Bay or cross the cape in close proximity to the Tuckahoe River basin.

Cape May Court House is nearly midway between Cape May on the south and the Tuckahoe River on the north. Now, on the ebb tide, when storms are passing down the Delaware, they are liable to either cross the cape in the vicinity of Woodbine and pass down the Tuckahoe River basin, with the tide to the ocean, and on the flood tide from the ocean across the cape to the bay, or pass down the Delaware past Cape May, thus avoiding a belt across Cape May County, with Cape May Court House as the center.

This is evident by the following normal annual precipitation as given in the annual report of the New Jersey Weather Service: Ocean City, 1900, 43.94 inches; Atlantic City, 1903, 43.71 inches; Woodbine, 1903, 43.68 inches; Cape May, 1903, 43.88 inches, and Cape May Court House, 1903, 41.13 inches.¹

From these figures it will be observed that Ocean City, situated near the mouth of the Tuckahoe River, receives a larger rainfall than either Atlantic City at the north or Woodbine or Cape May Court House at the south; that Woodbine, being situated farther from the river, receives less rainfall; that Cape May situated at the cape receives a large rainfall, and that Cape May Court House, being in the center of the belt, receives the least rainfall. On investigation of the reports it will be found the difference is noted during the summer months, or during the thunderstorm period, thus showing that the thunderstorms follow the rivers with the tides.

Yours, very respectfully,

L. T. GARRETSON,
Voluntary Observer.

WEATHER BUREAU RECORDS.

By virtue of Instructions No. 210, dated December 16, 1904, a number of changes will be made in the forms and records, which must be carefully considered by those of our colleagues throughout the world who are studying Weather Bureau data. Perhaps the most troublesome change is that depending on the adoption of local standard hour meridians instead of the uniform seventy-fifth meridian time that has been so convenient for meteorological, magnetic, and seismic work. We make the following extracts from the report of the board on the revision of forms, which report goes into effect January 1, 1905:

1. The adoption of a form to be known as the Daily Local Record. * * * This form provides for the entry of the hourly temperature readings; the hourly amounts of precipitation, with the time of beginnings and endings; the hourly sunshine; the hourly wind direction and velocity, and the hourly maximum wind velocities when above a certain limit, which limit will vary for the different stations. It also provides for entering the character of the day, the total sunshine in hours, prevailing wind direction, and other data; and a diagram is provided on which the daily temperature and pressure curves may be plotted, if desired. Space is also provided for the entry of abnormal conditions, severe storms, and other matter not expressed by the instrumental readings. An extra horizontal column, without heading, has been provided for the entry of data of excessive precipitation, now recorded on the back of Form 1017-Met'l, or other data, a record of which may be of sufficient importance to retain at the station. In short, it has been the aim to embody in the Daily Local Record form a complete history of the weather of the day. * * *

2. In the matter of compiling the hourly readings of the various instruments the board is of the opinion that sufficient compilations of the hourly barograph readings have been made, and it therefore recommends that Form 1026-Met'l, Barograph, be discontinued on December 31, 1904, at all stations now rendering said form. In regard to temperature the board is of the opinion that this element, aside from its purely climatic value, has sufficient public interest to warrant the tabulation of hourly values, as at present, but after tabulations are made and means found for a period of twenty years no further sums and means of the daily and hourly values need be made.

The hourly records of wind direction and movement are important, especially to Lake and sea-coast stations, and at some points in the interior. Since frequent changes in the exposure of wind instruments have been made in the past, and since it is probable that such changes will continue to be made in the future, the matter of determining monthly and seasonal normals becomes exceedingly difficult. Each exposure of the anemometer forms, in itself, a separate and distinct record, and should be treated as such. Unless a series of comparative readings are made between the old and new exposures a combination of the two series in a general mean is not satisfactory. Therefore, when a removal is to be made, a series of comparative readings, extending over at least a year, should be made whenever practicable. It is believed that these data should continue to be tabulated as at present. At those stations where an undisturbed and continuous exposure has been had for a period of ten or fifteen years, it is quite probable that fairly accurate normals could be obtained, and those stations might be authorized to cease computing sums and means.

3. Form 1001-Met'l. The board recommends the adoption of a new Form 1001-Met'l. * * * The new form retains pages 2, 3, 6, and 8 of

¹ These normals are based on the following length of record: Ocean City, eleven years; Atlantic City, twenty-seven years; Woodbine, eleven years; Cape May Court House, fifteen years. The normals are therefore not comparable with one another.—F. O. S.